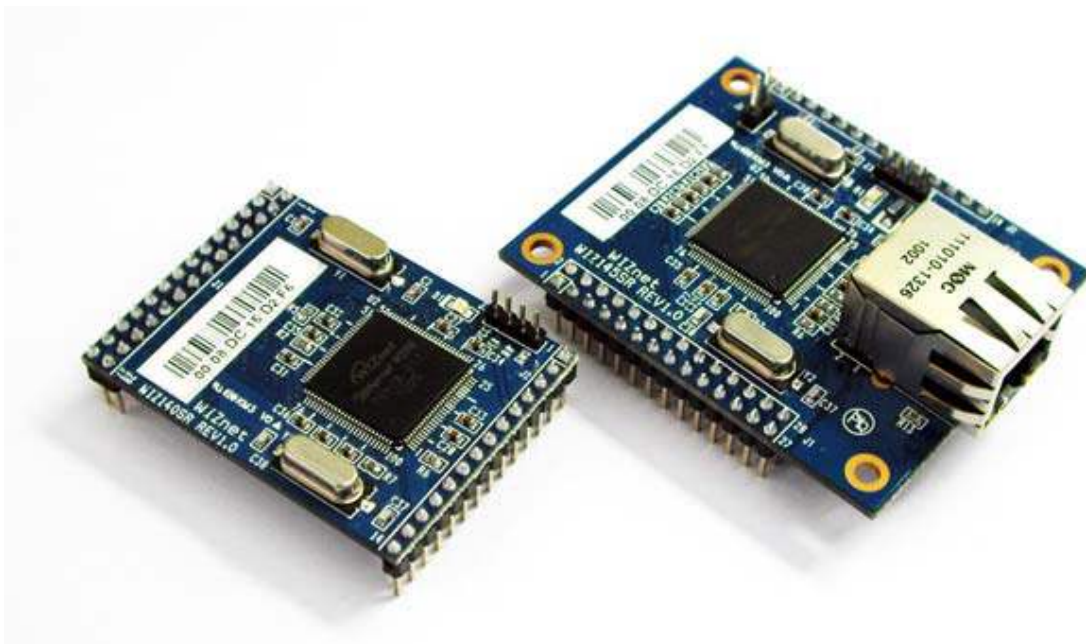


WIZ140SR / WIZ145SR User's Manual

(Version 2.0.1)



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2012-06-15	v2.0.0	Modify the error sentence (P3, P8, P10, P13, P16)
2013-06-19	v2.0.1	Changed the document version notation and file name.

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Technical Support: support@wiznet.co.kr

Sales & Distribution: sales@wiznet.co.kr

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1. Introductions

1.1 Main Features

- Support 4 Serial port
- Connect with the Serial Device directly
 - Adding network function simply and quickly
 - Providing Firmware customization
- High system stability and reliability by using W5300
- Easy and powerful configuration tool program
- Support DHCP and DNS function
- Support static as well as dynamic IP setting
- 10/100 Mbps Ethernet interface, Max 115,200bps serial interface
- RoHS compliant

1.2 Specifications

		WIZ140SR	WIZ145SR
Architecture	MCU	ARM-based 32-bit MCU	
	TCP/IP	W5300	
	PHY	Included in W5300 10/100Mbps Ethernet Auto negotiation (Full-duplex and Half-duplex) Auto MDI/MDIX	
	Serial	RS-232C	
Serial Data Port	Interface	TTL	
	Signals	TXD, RXD, RTS, CTS, GND	
	Parameters	Parity : None, Odd, Even Data bits : 7, 8 bit Flow control : None, RTS / CTS, XON / XOFF	
	Speed	Up to 115,200bps	
Serial Debug Port	Interface	TTL	
	Signals	TXD, RXD	
	Parameters	Parity : None Data bits : 8 bit Flow control : None	
	Speed	115,200bps	
Dimensions (Include connector size)		48.26mm x 35.56mm x 16.2mm	48.26mm x 61.4mm x 24.7mm
Pin header Connector		2.54mm Pitch Pin-header, 14Pin (1x14) 2.54mm Pitch Pin-header, 28Pin (2x14)	
RJ-45 Connector		None	1 RJ-45 Connector
Input voltage		DC 3.3V	
Power consumption		Under 200mA	
Temperature		0°C ~ 70°C (Operation), -40°C ~ 85°C (Storage)	
Humidity		10 ~ 80%	

Table 1 Specifications

2. Getting Start

2.1 Install Hardware

You prepared WIZ140SR Module or WIZ145SR module with Test board.

STEP1: Drop the WIZ140SR/WIZ145 Module in WIZ140SR/WIZ145SR Test Board.

STEP2: Connect Ethernet cable to RJ-45 connector on the Test Board

STEP3: Connect PC and Test Board using Serial Cable.

STEP4: If you check Debugging message from debug serial port, you connect PC and Test Board using Serial Cable.

STEP5: connect to the power

*1. Boot selection pin is open, when working normal mode.

*2. H/W Trigger switch is OFF.

2.2 Configuration Tool Installation

Start the Configuration Tool Installation program, which can be downloaded from the WIZnet home page. The captured screen of the Configuration tool is as shown below.

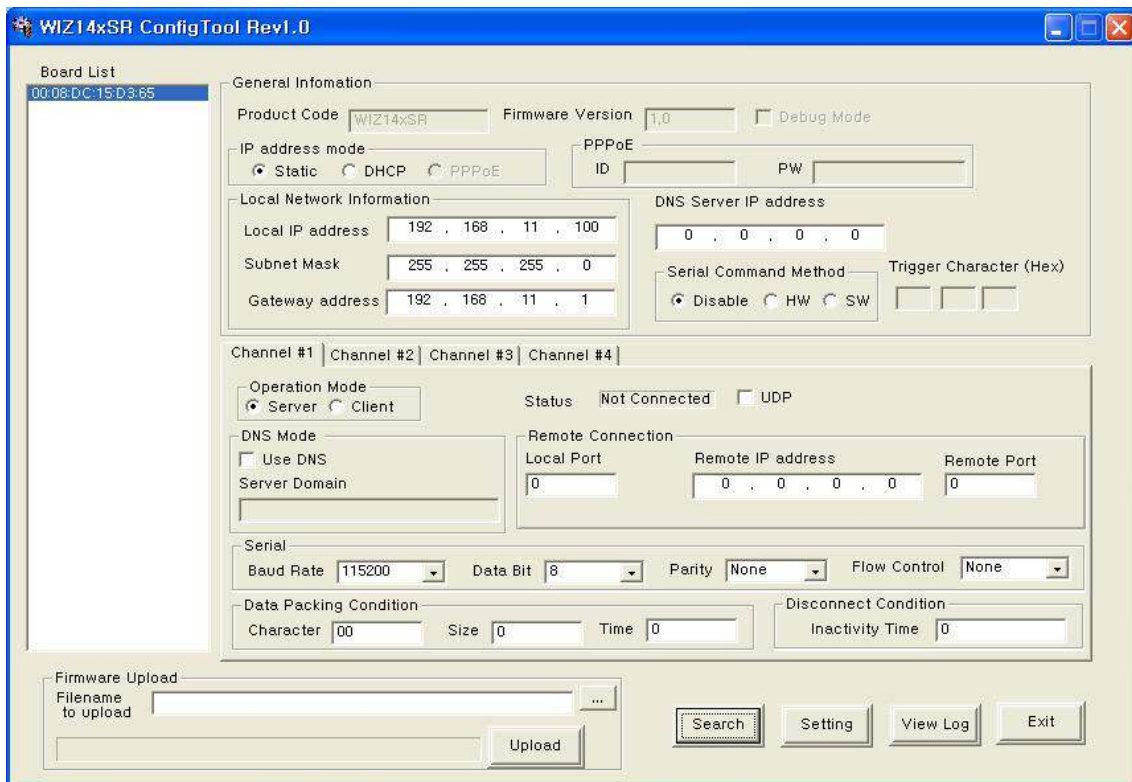



Image 1 Configuration tool

3 Functions

3.1 Module Configuration thru TCP/IP

Basic Information for modules, WIZ140SR and WIZ145SR, can be set by using TCP/IP network.

- ① Connect the module and PC, that has ConfigTool.exe installed, to the network of same subnet and turn on power.
- ② Click the  button from the Tool program, then, all modules that are connected to the local network will display.
- ③ Use the Configuration Tool to modify the settings of each module.

Specific modification steps are explained after 3.3 of this document

3.2 Module Configuration thru Serial command

This function is used to modify the settings of the module by using Serial port.

Connect the cable to the module's Channel #1 serial port and switch the HW Trigger SW's pin to 'ON.' Then, Serial command mode is accessed.

- ※ **Caution! Once Serial command mode is activated, the connected TCP socket is disconnected, therefore, data exchange through the data channel is not possible.**

3.2.1 Serial command Format

1 Byte	4 Bytes	(0 ~ 32 Bytes)	1Byte
STX ¹	Command code	Parameter	ETX ²

Image 2 Serial Command Frame Format

¹ STX : '<' (Hex code: 0x3C)

² ETX : '>' (Hex code: 0x3E)

3.2.2 Command code(Direction: Serial device -> MODULE)

	Code	Parameter	Comments
General Info	R_PC	None	Get Product Code
	R_IP	None	Get Local IP Address
	W_IP	xxx.xxx.xxx.xxx	Set Local IP Address
	R_SN	None	Get Subnet Mask
	W_SN	xxx.xxx.xxx.xxx	Set Subnet Mask
	R_GW	None	Get Gateway Address
	W_GW	xxx.xxx.xxx.xxx	Set Gateway Address
	R_FW	None	Get Firmware Version
	R_DB	None	Get Debug mode value
	W_DB	0: Disable 1 : Enable	Set Debug mode value
	R_MD	None	Get IP setting mode value
	W_MD	0: Static 1: DHCP 2 : PPPoE	Set IP setting mode value
	R_CM	None	Get Serial command mode type
	W_CM	0: H/W trigger 1: S/W trigger	Set Serial command mode type
	R_SC	None	Get Serial command mode character
	W_SC	xxxxxx	Set Serial command mode character
	R_DS	None	Get DNS Server IP Address
	W_DS	xxx.xxx.xxx.xxx	Set DNS Server IP Address
	W_XX	None	Reboot module
	Channel Info	RnSM	None
WnSM		0: TCP Server 1: TCP Client 2: Mixed	Set Socket operation mode <i>n</i> : channel number(0 ~ 3)
RnCS		None	Get Socket connection state <i>n</i> : channel number(0 ~ 3)
RnDM		None	Get DNS mode value <i>n</i> : channel number(0 ~ 3)

WnDM	0: Disable 1: Enable	Set DNS mode value <i>n</i> : channel number(0 ~ 3)																										
RnUM	None	Get UDP mode value <i>n</i> : channel number(0 ~ 3)																										
WnUM	0: Disable 1: Enable	Set UDP mode value <i>n</i> : channel number(0 ~ 3)																										
RnSI	None	Get Remote Peer's IP Address <i>n</i> : channel number(0 ~ 3)																										
WnSI	xxx.xxx.xxx.xxx	Set Remote Peer's IP Address <i>n</i> : channel number(0 ~ 3)																										
RnLP	None	Get Local port number <i>n</i> : channel number(0 ~ 3)																										
WnLP	0 ~ 65535	Set Local port number <i>n</i> : channel number(0 ~ 3)																										
RnSP	None	Get Remote Peer's port number <i>n</i> : channel number(0 ~ 3)																										
WnSP	0 ~ 65535	Set Remote Peer's port number <i>n</i> : channel number(0 ~ 3)																										
RnSD	None	Get Remote Peer's Domain name <i>n</i> : channel number(0 ~ 3)																										
WnSD	xxxxxxxxxxxxxx(Variable)	Set Remote Peer's Domain name <i>n</i> : channel number(0 ~ 3)																										
RnBU	None	Get Serial configuration value(Baud rate, data bit, parity and flow control) <i>n</i> : channel number(0 ~ 3)																										
WnBU	xxxx [Baud] <table border="1" data-bbox="582 1585 911 1787"> <tr><td>0</td><td>115200</td><td>1</td><td>57600</td></tr> <tr><td>2</td><td>38400</td><td>4</td><td>19200</td></tr> <tr><td>4</td><td>9600</td><td>5</td><td>4800</td></tr> <tr><td>6</td><td>2400</td><td>7</td><td>1200</td></tr> </table> [Data] <table border="1" data-bbox="582 1832 911 1883"> <tr><td>0</td><td>7bit</td><td>1</td><td>8bit</td></tr> </table> [Parity] <table border="1" data-bbox="582 1928 911 2029"> <tr><td>0</td><td>1</td><td>2</td></tr> <tr><td>None</td><td>Odd</td><td>Even</td></tr> </table>	0	115200	1	57600	2	38400	4	19200	4	9600	5	4800	6	2400	7	1200	0	7bit	1	8bit	0	1	2	None	Odd	Even	Set Serial configuration value(Baud rate, data bit, parity and flow control) <i>n</i> : channel number(0 ~ 3) 4Bytes : [Baud][Data][Parity][Flow]
0	115200	1	57600																									
2	38400	4	19200																									
4	9600	5	4800																									
6	2400	7	1200																									
0	7bit	1	8bit																									
0	1	2																										
None	Odd	Even																										

			[Flow Control]		
			0	1	2
			None	Xon/Xoff	RTS/CTS
RnOC	None		Get Data Packing Condition 'Char' <i>n</i> : channel number(0 ~ 3)		
WnOC	xx		Set Data Packing Condition Char <i>n</i> : channel number(0 ~ 3) ex) if value is 0x0D, then '0"D'		
RnOS	None		Get Data Packing Condition 'Size'		
WnOS	0 ~ 255		Set Data Packing Condition 'Size' <i>n</i> : channel number(0 ~ 3)		
RnOT	None		Get Data Packing Condition 'Time' <i>n</i> : channel number(0 ~ 3)		
WnOT	0 ~ 65535		Set Data Packing Condition 'Time' <i>n</i> : channel number(0 ~ 3)		
RnOI	None		Get Inactivity Time value <i>n</i> : channel number(0 ~ 3)		
WnOI	0 ~ 65535		Set Inactivity Time value <i>n</i> : channel number(0 ~ 3)		

Table 2 Serial Command Code Table

3.2.3 Reply code(Direction: WIZ140SR/WIZ145SR -> Serial device)

Reply	Meaning
E	Serial command mode Start
S	Command Success
F	Command Fail
1	Invalid command
2	Invalid parameter

Table 3 Serial Command Reply Code Table

3.2.4 Example

3.2.4.1 Command for changing the IP address of the module

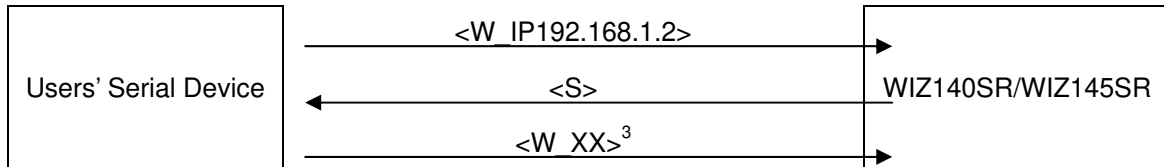


Image 3 Serial Command Example #1

3.2.4.2 Command for setting the Domain Name of Channel #1

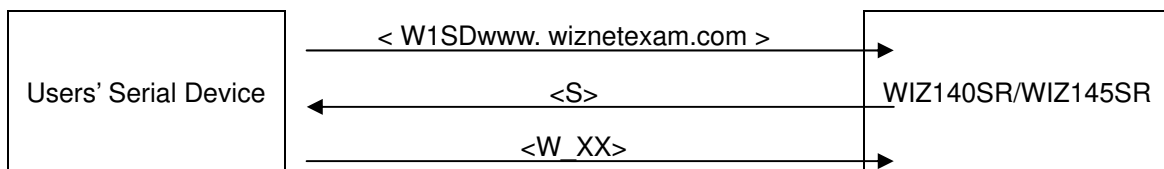


Image 4 Serial Command Example #2

3.2.4.3 Command for reading the Local Port Number of Channel #3

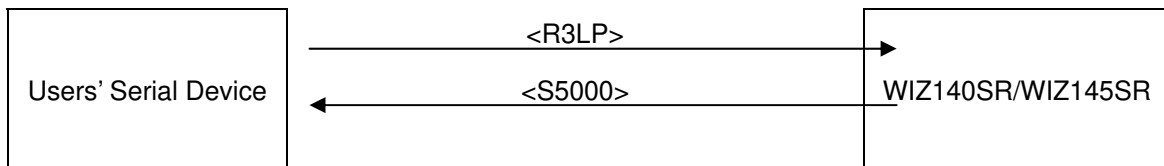


Image 5 Serial Command Example #3

3.3 IP Acquisition Mode (Static, DHCP, PPPoE) Setting Function

This function is for setting how the module's IP address is going to be acquired.

3.3.1 Static

The Static IP address mode is used when assigning static IP address.

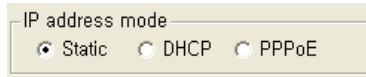
When Permanent IP address is assigned by the network manager,

- ① First, click the button to find module that is connected to the network.

³ In case of Set command, command W_XX must be sent at the end in order for the module to be configured.

- ② Select the module that the value will be assigned from the ListBox, which is shown at the left of the screen.

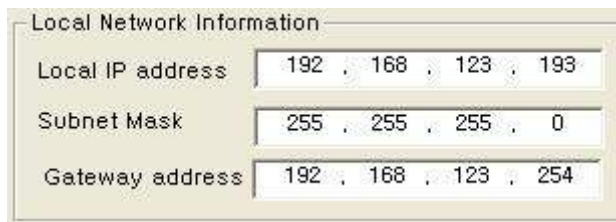
- ③ Select Static for the IP address mode,



IP address mode

Static DHCP PPPoE

- ④ Enter the assigned values for IP address, Subnet mask, and Gateway address,



Local Network Information

Local IP address 192 . 168 . 123 . 193


Subnet Mask 255 . 255 . 255 . 0

Gateway address 192 . 168 . 123 . 254

- ⑤ Click .

3.3.2 DHCP

The DHCP IP address mode is used when equipment that assign dynamic IP, like routers are connected.

- ① First, click the  button and find the module that is connected to the network.
- ② Select the module that the value will be assigned from the ListBox, which is shown at the left of the screen.
- ③ Select DHCP for the IP address mode,



IP address mode


Static DHCP PPPoE

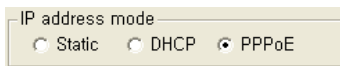
- ④ Click .

※ **When there is not a DCHP server, the DHCP process fails. When the DHCP process fails, booting completes with the existing network information after a period of time..**

3.3.3 PPPoE

The PPPoE IP address mode is used for setting the environment which communicate based on PPPoE, like ADSL modem.

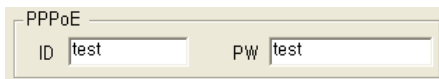
- ① First, click the  button and find the module that is connected to the network.
- ② Select the module that the value will be assigned from the ListBox, which is shown at the left of the screen,
- ③ Select PPPoE for the IP address mode,



IP address mode


Static DHCP PPPoE

- ④ Enter values of the ID and PW for PPPoE access.




PPPoE

ID PW

- ⑤ Lastly, click .

3.4 Connection Mode (Server, Client, UDP) Setting Function

3.4.1 Server Mode

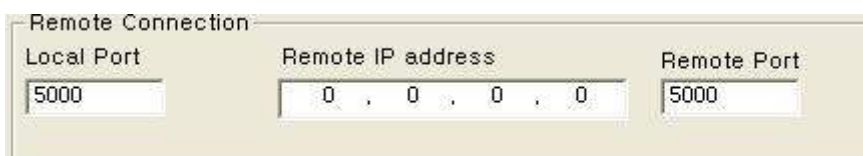
- ① First, click the  button and find the module that is connected to the network
- ② Select the module that the value will be assigned from the ListBox, which is shown at the left of the screen
- ③ Select Server for Connection mode,



Operation Mode


Server Client

- ④ “Enter the Local Port value for Listen in the “Internet Connectivity Information box.”



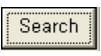
Remote Connection

Local Port	Remote IP address	Remote Port
<input type="text" value="5000"/>	<input type="text" value="0 . 0 . 0 . 0"/>	<input type="text" value="5000"/>

⑤ Lastly, click .

※ **When Server mode is used, Remote IP address and Remote Port has no use.**

3.4.2 Client Mode


① First, click the  button and find the module that is connected to the network

② Select the module that the value will be assigned from the ListBox, which is shown on the left of the screen

③ Select Client for Connection mode




④ Enter the IP and Port number from the “Internet Connectivity Information box” into the “Remote IP address” and “Remote Port.” Enter the Module’s communication Port number into Local Port

⑤ Lastly, click .

※ **When Client mode is being used, the module continuously attempts connection to Remote IP address and Remote Port after booting.**

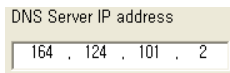
3.5 DNS Setting Function

This function is used when Domain name is used due to server’s frequent change and non-fixed server IP. If the server address is the Domain name instead of the IP address, this function must be used.

① First, click  button, and find the module that is connected to the network

② Select the module that the value will be assigned from the ListBox, which is shown on the left of the screen,

③ Enter IP into DNS Server IP.



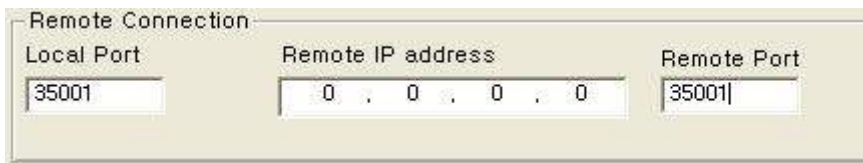
DNS Server IP address
164 . 124 . 101 . 2

④ Check the box for “DNS mode,” and enter the Server Domain Name.




DNS Mode
 Use DNS
Server Domain
www,abc,com

⑤ Enter the Port numbers for server and module.



Remote Connection
Local Port Remote IP address Remote Port
35001 0 . 0 . 0 . 0 35001

⑥ Lastly, click .

3.6 Real-time Debug Function

This function is used to check on the motion of the module when the module is attached to the system during the system development process. The Console port is used to read the debug code of the module in real time.

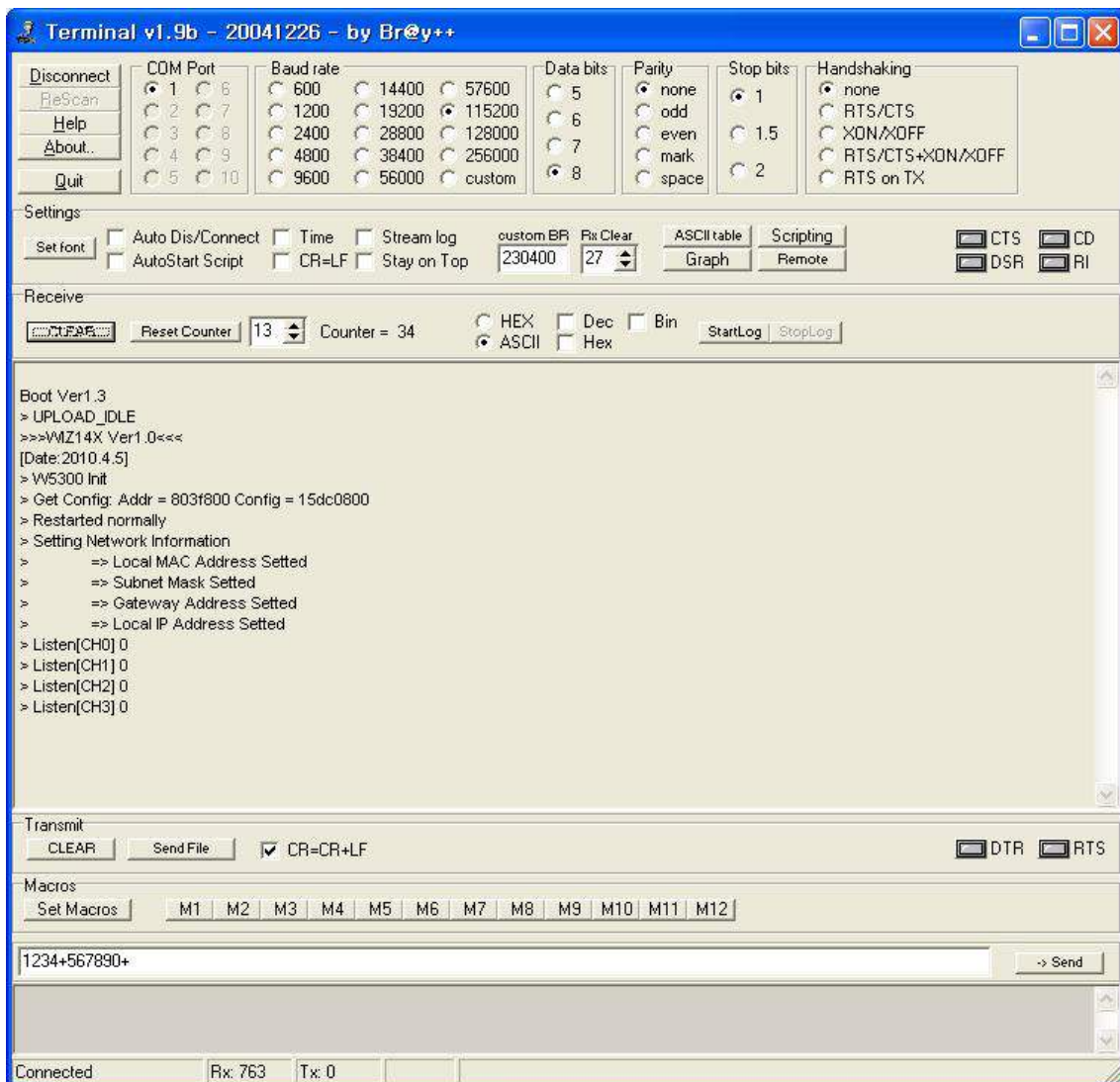


Image 6 Debugging from Debug serial port


3.7 Data Packet Function

This function is used to determine whether the data read from the serial port is going to be sent to the remote server or client in some kind of Ethernet packet unit.

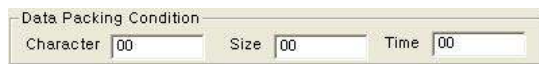
3.7.1 Character


The data is buffered in the internal memory of the module until the specific characters are received. Once the specific characters are received, the buffered data are made into one Ethernet packet and are sent to the remote system.

This function is appropriate when the end of data frame that the serial port sends to the module ends with specific characters.

- ① First, click  button, and find the module that is connected to the network.
Select the module that the value will be assigned from the ListBox, which is shown on the left of the screen,

- ② Enter the ASCII value of the character in the form of HEX code in the “Character” section of the “Data Packing Condition” box. (Enter 0x00 for Disable)




- ③ Lastly, click .

3.7.2 Size


This function is used when data is buffered in the serial port until the received data amounts to a specific byte size, and when the received data amounts up to the specific byte size, the buffered data are made into one Ethernet packet and sent to the remote system.

This function is appropriate when size of the data, which is sent from the serial port to the module, is fixed.

- ① First, click  button, and find the module that is connected to the network.
- ② Select the module that the value will be assigned from the ListBox, which is shown on the left of the screen


- ③ Enter the wanted size in the “Size” section of the “Data Packing Condition” box.
(Enter 0 for Disable)



- ④ Lastly, click .

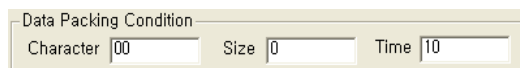
3.7.3 Time

If there is not any new data during designated time, all data in the serial buffer is converted to Ethernet packet. If new data is received, the time is re-calculated and the received data is saved in the serial buffer. Time condition can be utilized when the serial data size is variable and has no ending character, but needs to be delivered in frame unit. (If the value is '0', option is not used)


- ① First, click  button, and find the module that is connected to the network.

Select the module that the value will be assigned from the ListBox, which is shown on the left of the screen,

- ② Enter the wanted time information in the "Time" section of the "Data Packing Condition" box. (Enter 0 for Disable)



Data Packing Condition					
Character	00	Size	0	Time	10


- ③ Lastly, click .

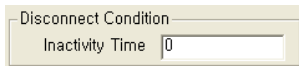
3.7.4 Compound Settings


Among the three functions explained above, two or more can be mixed for use.

3.8 Inactivity Time Function

This function is used to forcibly disconnect the communication connection (TCP socket) when there are no data exchange with the remote system for a certain period of time.



- ① First, click  button, and find the module that is connected to the network.
select the module that the value will be assigned from the ListBox, which is shown on the left of the screen,
- ② Enter the wanted time information in the “Inactivity Time” section of the “Disconnect Condition” box. (Enter 0 for Disable)




- ③ Lastly click .

3.9 Firmware uploading thru TCP/IP

This function is used for updating the module’s Firmware

- ① First, click  button, and find the module that is connected to the network.
- ② Select the module that the value will be assigned from the ListBox, which is shown on the left of the screen,
- ③ Click  to select the binary file for update.



- ④ Lastly, click .

※ In order to use the Firmware upload function, an IP address for communication with the module must be set. Make sure to ping test to check the module is able to communicate.

3.10 Log Data save and report function

The module saves its operation and results in its memory; this function can load and read when the user wishes to. This function can be used to check on the problems when the communication with the remote system is not good. For example, things like, whether the serial device sent the data, or whether the module was down, or whether there was a problem with the communication circuit (ISP communication circuit), can be checked.

3.10.1 Log Data

3.10.1.1 Log Data Frame

<i>Byte 1</i>	<i>Byte 2</i>	<i>Byte 3</i>	<i>Byte 4</i>	<i>Byte 5</i>	<i>Byte 6</i>	<i>Byte 7</i>	<i>Byte 8</i>
Time Information[0:3]				CODE	PARAM1	PARAM2	PARAM3
<i>Log time</i>				<i>Log value</i>			

Image 7 Log Data Frame

3.10.1.2 Code & Parameter

Code Value(4Byte)				Meaning	Remarks
CODE	PARAM1	PARAM2	PARAM3		
0x01	0x00	0x00	0x00	Operation succeeded	
0x02	0x00	0x00	0x00	Operation failed	
0x10	0x00	0x00	0x00	Reboot	
0x11	0x00	0x00	0x00	DHCP init start	
0x12	0x00	0x00	0x00	DNS query start	
0x13	0x00	0x00	0x00	PPPoE init start	
0x20	<i>n</i>	0x00	0x00	Socket <i>n</i> Initialized	<i>n</i> : Socket #

0x21	<i>n</i>	0x00	0x00	Socket <i>n</i> Connecting
0x22	<i>n</i>	0x00	0x00	Socket <i>n</i> Listen
0x23	<i>n</i>	Size_H ⁴	Size_L ⁵	Socket <i>n</i> lbytes data sent
0x24	<i>n</i>	Size_H	Size_L	Socket <i>n</i> lbytes data received
0x25	<i>n</i>	0x00	0x00	Socket <i>n</i> Closed
0x30	0x00	0x00	0x00	FW Upload requested
0x31	0x00	0x00	0x00	FW Upload completed
0x32	0x00	0x00	0x00	FW Upload failed
0x40	0x00	0x00	0x00	Config Data Writing
0x41	0x00	0x00	0x00	Config Data Reading

Table 4 Log data code & parameter Table

⁴ Sent from Ethernet or higher byte among data size

⁵ Lower byte among data size

3.11 TCP Connection Status Function

This function is used to check the connection status for each channel of the module.

This can be checked through the H/W pin. If the value of the Pin is Low, the status is “Connected”. If the value of the Pin is HIGH, the status is “Disconnected”.

※ In case of Serial command mode, all communication channels are forcibly cleared; and the Connection status can't be checked through the serial.

4 Test

4.1 Operate in Server mode

4.1.1 Composition

Module		PC	
IP address(Static)	192.168.123.193	IP address	192.168.123.101
Ch# 1 Port number	5000	Port number	auto
Ch#1 Socket mode	Server	Socket mode	Client
Ch#1 Packing cond.	Time 10ms		
Ch#2 Port number	5001	Port number	auto
Ch#2 Socket mode	Server	Socket mode	Client
Ch#2 Packing cond.	Time 10ms		
Ch#3 Port number	5002	Port number	auto
Ch#3 Socket mode	Server	Socket mode	Client
Ch#3 Packing cond.	Disable		
Ch#4 Port number	5003	Port number	auto
Ch#4 Socket mode	Server	Socket mode	Client
Ch#4 Packing cond.	Size 10		

4.1.2 Operation Order

- ① First, click button, and find the module that is connected to the network.
- ② Select the module that the value will be assigned from the ListBox, which is shown on the left of the screen,
- ③ Channel #1 Configurations

Channel #1 | Channel #2 | Channel #3 | Channel #4

Operation Mode
 Server Client

Status Not Connected UDP

DNS Mode
 Use DNS
 Server Domain

Remote Connection
 Local Port: 5000
 Remote IP address: 0 . 0 . 0 . 0
 Remote Port: 5000

Serial
 Baud Rate: 115200 Data Bit: 8 Parity: None Flow Control: None

Data Packing Condition
 Character: 00 Size: 0 Time: 10

Disconnect Condition
 Inactivity Time: 0

④ Channel #2 Configurations

Channel #1 | Channel #2 | Channel #3 | Channel #4

Operation Mode
 Server Client

Status Not Connected UDP

DNS Mode
 Use DNS
 Server Domain

Remote Connection
 Local Port: 5001
 Remote IP address: 0 . 0 . 0 . 0
 Remote Port: 5001

Serial
 Baud Rate: 1200 Data Bit: 8 Parity: None Flow Control: None

Data Packing Condition
 Character: 00 Size: 0 Time: 10

Disconnect Condition
 Inactivity Time: 0

⑤ Channel #3 Configurations

Channel #1 | Channel #2 | Channel #3 | Channel #4

Operation Mode
 Server Client

Status Not Connected UDP

DNS Mode
 Use DNS
 Server Domain

Remote Connection
 Local Port: 5002
 Remote IP address: 0 . 0 . 0 . 0
 Remote Port: 5002

Serial
 Baud Rate: 1200 Data Bit: 8 Parity: None Flow Control: None

Data Packing Condition
 Character: 00 Size: 0 Time: 0

Disconnect Condition
 Inactivity Time: 0

⑥ Channel #4 Configurations

Channel #1 | Channel #2 | Channel #3 | Channel #4

Operation Mode
 Server Client

Status Not Connected UDP


DNS Mode
 Use DNS
 Server Domain

Remote Connection
 Local Port: 5003
 Remote IP address: 0 . 0 . 0 . 0
 Remote Port: 5003

Serial
 Baud Rate: 1200 Data Bit: 8 Parity: None Flow Control: None

Data Packing Condition
 Character: 00 Size: 10 Time: 0

Disconnect Condition
 Inactivity Time: 0

- ⑦ Click 
- ⑧ Apply the new values of the module and reboot.

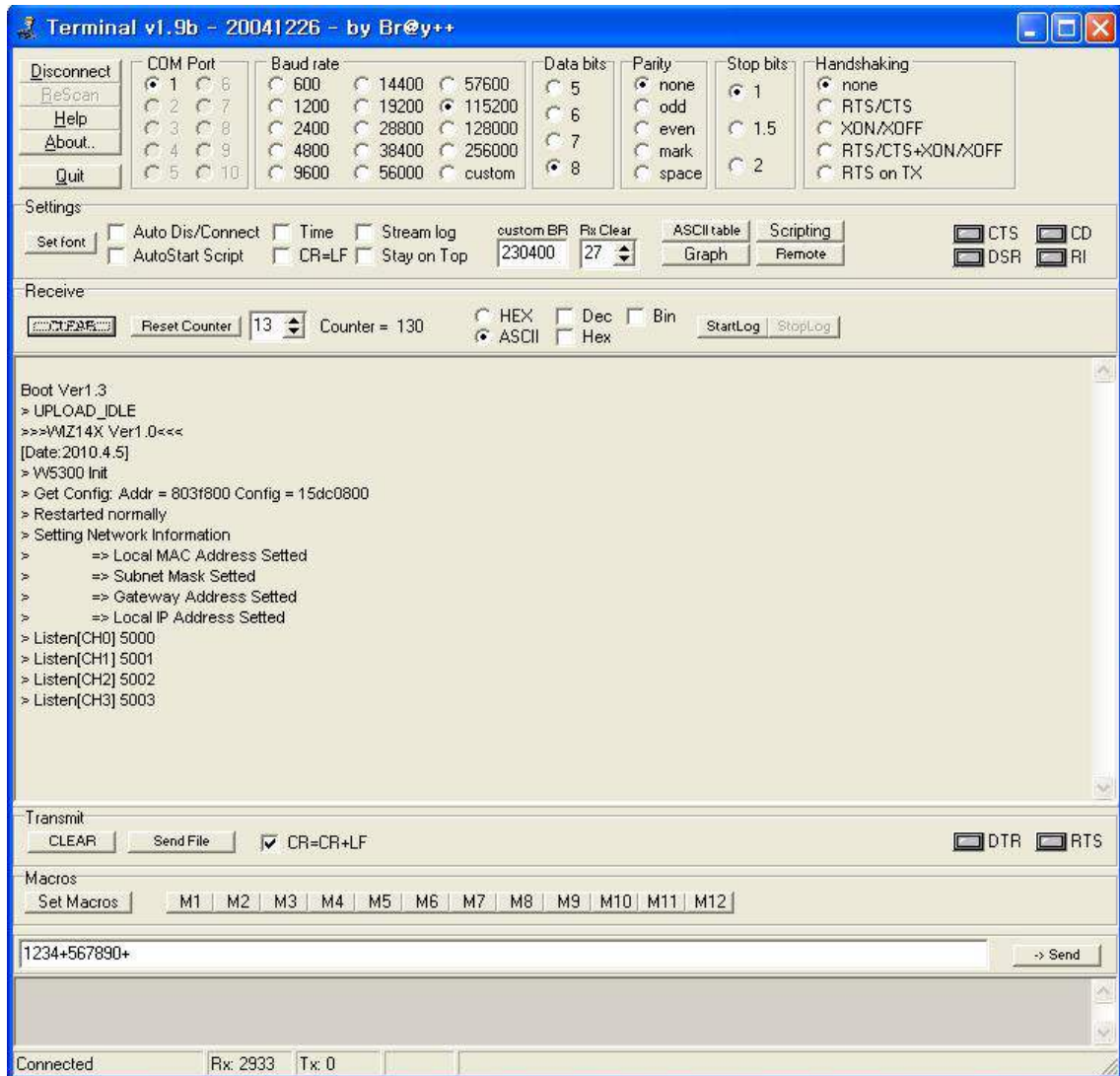


Image 8 Console screen during module booting process

- ⑨ Run the Socket communication program, and attempt connection.

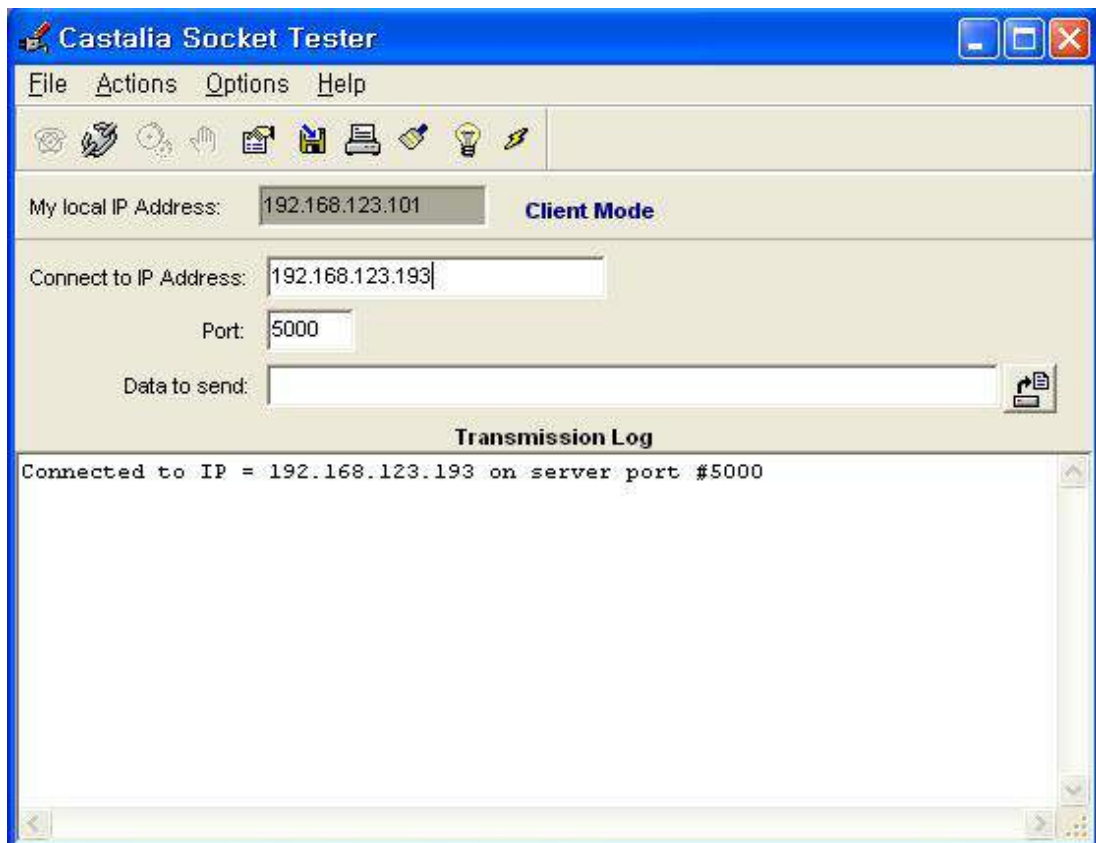


Image 9 Screen after connecting to module with TCP/IP

- ⑩ Connection with module can be checked by using the Debug terminal.

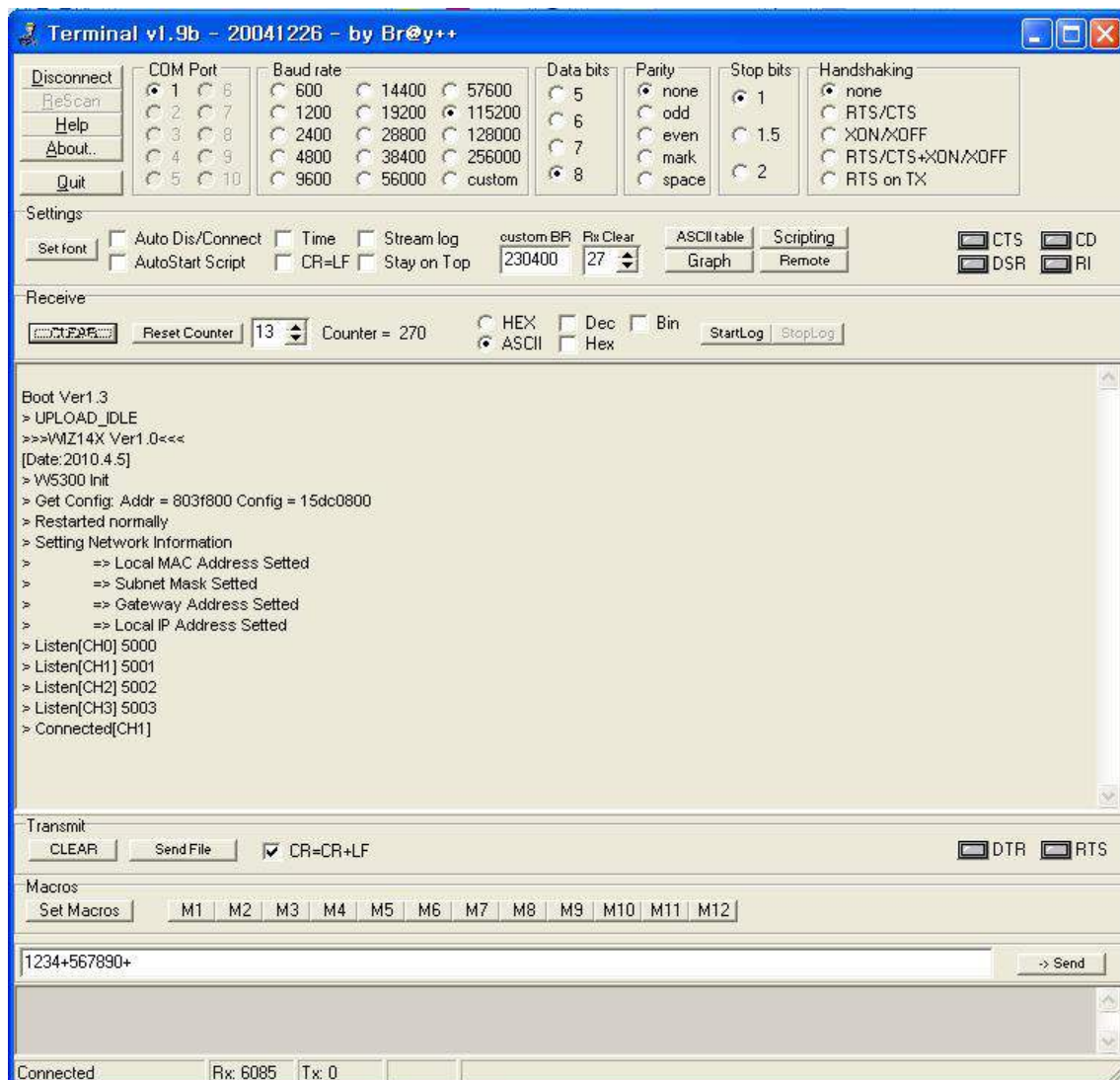


Image 10 Consol screen after TCP Connection

- ⑪ Repeat these steps with other channels to access, and data communication is enable.